

# Beyond the NAS Report: Improving Science for All in Our Criminal Justice System

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Randall Murch, PhD

Virginia Tech, National Capital Region

# **Quality, Reliability, Credibility**

**Of the 13  
Recommendations in  
the NAS Report, Part or  
the Majority of 11  
Address Issues of  
Quality, Reliability or  
Credibility**

# Terms of Reference: “Quality”, “Reliability”, “Credibility”

- Quality
  - Relevant, Effective, Valuable, Sustainable, Resilient
- Reliability
  - Dependable, Repeatable, Useable, Robust, Valid
- Credibility
  - Believable, Trustable, Understandable, Testable

**Presentation Will Focus  
On Pertinent NAS  
Recommendations  
And  
Moving Forward from  
These Perspectives**

# NAS “Strengthening Forensic Science”

- Charged and funded by Congress (not by forensic science organizations for altruistic purposes as some claim)
- Congress was the “customer”
- Broad, critical, independent view sought
  - The NAS is given a “problem set”, study is performed, observations and recommendations arrived at, “read it and weep”
- NAS reputation depends on delivering quality product, within strict rules of engagement
  - Stay within Charge
  - Thorough and Critical within Time Allotted
  - Independent of Politics and Agendas
  - Protect Against Conflicts of Interest
- As with all NAS reports, nothing happens unless the sponsor or others in position to do so take action

# Charge to NAS & Committee

- **Assess the present and future resource needs of the forensic science community, to include State and local crime labs, medical examiners, and coroners**
- **Make recommendations for maximizing the use of forensic technologies and techniques to solve crimes, investigate deaths, and protect the public**
- **Identify potential scientific advances that may assist law enforcement in using forensic technologies and techniques to protect the public**
- **Make recommendations for programs that will increase the number of qualified forensic scientists and medical examiners available to work in public crime laboratories**
- **Disseminate best practices and guidelines concerning the collection and analysis of forensic evidence to help ensure quality and consistency in the use of forensic technologies and techniques to solve crimes, investigate deaths, and protect the public**
- **Examine the role of the forensic community in the homeland security mission**
- **Examine interoperability of Automated Fingerprint Information Systems**
- **Examine additional issues pertaining to forensic science as determined by the Committee**

# NAS: Quality, Reliability, Credibility

## Role of Coordinated National Governance

### ■ Recommendation 1:

- Establish and enforce best practices for forensic science professionals and laboratories
- Establish standards for the mandatory accreditation of forensic science laboratories and the mandatory certification of forensic scientists and medical examiners/forensic pathologists—and identifying the entity/entities that will develop and implement accreditation and certification
- Promote scholarly, competitive peer-reviewed research and technical development in the forensic science disciplines and forensic medicine
- Develop a strategy to improve forensic science and pathology research and educational programs

# NAS: Quality, Reliability, Credibility

## Role of National Governance

### ■ Recommendation 1 (Cont.):

- Establish a strategy, based on accurate data, for the efficient allocation of available funds to give strong support to forensic methodologies and practices (in addition to DNA analysis)
- Fund state and local forensic science agencies, independent research projects, and educational programs to advance the credibility and reliability of forensic science disciplines
- Oversee education standards and the accreditation of academic forensic science programs
- Improve understanding of the forensic science disciplines and their limitations within legal systems
- Assess the development and introduction of new forensic technologies including a comparison of new technologies with former ones

# NAS: Quality, Reliability, Credibility

## Improving Communication for Better Use

### ■ Recommendation 2

- Establish standard terminology to be used in reporting on and testifying about the results of forensic science investigations.
- Establish model laboratory reports for different forensic science disciplines and specify the minimum information that should be included.
  - Forensic scientists should be required to utilize model laboratory reports when summarizing the results of their analyses

# NAS: Quality, Reliability, Credibility

## Improving Performance, Expectations of Science

- **Recommendation 3:**
  - Research is needed to address issues of accuracy, reliability, and validity in the forensic science disciplines.
    - Studies establishing the scientific bases demonstrating the validity of forensic methods.
    - Development and establishment of quantifiable measures of the reliability and accuracy of forensic analyses
      - Reflect actual practice on realistic case scenarios
      - Establish published limits of reliability and accuracy for analytic methods
  - Develop and report quantifiable measures of uncertainty in conclusions of forensic analyses
  - Automated techniques capable of enhancing forensic technologies

# NAS: Quality, Reliability, Credibility

## Mitigate & Minimize Human Error & Bias

### ■ Recommendation 5:

- Research programs on human observer bias and sources of human error in forensic examinations.
- Studies to determine the effects of contextual bias in forensic practice
- Research on sources of human error should be closely linked with research conducted to identify, quantify and characterize the sources and contributions of error, including human error.
- Develop standard operating procedures and protocols to minimize, to the greatest extent reasonably possible, potential bias and sources of human error in forensic practice.
  - Standard operating procedures should apply to all forensic analyses that may be used in litigation.

# NAS: Quality, Reliability, Credibility

## Improving Forensic System Reliability, Consistency

- **Recommendation 6:**
  - Develop tools for advancing measurement, validation, reliability, information sharing, and proficiency testing in forensic science and to establish (consistent, standard) protocols for forensic examinations, methods, and practices
  - Standards should reflect best practices and serve as accreditation tools for laboratories and as guides for the education, training, and certification of professionals.

# NAS: Quality, Reliability, Credibility

## Standardize Laboratory & Performer Quality

### ■ Recommendation 7:

- **Laboratory accreditation and individual certification of forensic science professionals should be mandatory, and all forensic science professionals should have access to a certification process.**
  - **For appropriate standards for accreditation and certification, take into account established and recognized international standards**
  - **All persons (public or private) should not be allowed to practice in a forensic science discipline or testify without certification.**
  - **Certification requirements should include written examinations, supervised practice, proficiency testing, continuing education, recertification procedures, adherence to a code of ethics, and effective disciplinary procedures.**
  - **All laboratories and facilities (public or private) should be accredited, and all forensic science professionals should be certified, within an established time period**

# NAS: Quality, Reliability, Credibility

## Quality Assurance & Quality Control

- **Recommendation 8:**
  - **Forensic laboratories should establish routine quality assurance and quality control procedures to ensure the accuracy of forensic analyses and the work of forensic practitioners**
  - **Quality control procedures should be designed to:**
    - identify mistakes, fraud, and bias;
    - confirm the continued validity and reliability of standard operating procedures and protocols;
    - ensure that best practices are being followed;
    - correct procedures and protocols that are found to need improvement.

# NAS: Quality, Reliability, Credibility

## Single National Code of Ethics & Enforcement

### ■ Recommendation 9:

- Establish a national code of ethics for all forensic science disciplines
  - Encourage individual societies to incorporate this national code as part of their professional code of ethics
- Explore mechanisms of enforcement for those forensic scientists who commit serious ethical violations
  - Code could be enforced through a certification process for forensic scientists.

# NAS: Quality, Reliability, Credibility Improvement through Workforce Development

## ■ Recommendation 10:

- Attract students in the physical and life sciences to pursue graduate studies in multidisciplinary fields critical to forensic science practice, and improve and develop graduate education programs designed to cut across organizational, programmatic, and disciplinary boundaries
- Develop and improve methods and methodologies applicable to forensic science practice through funding research programs to attract research universities and students in fields relevant to forensic science
- Support law school administrators and judicial education organizations in establishing continuing legal education programs for law students, practitioners, and judges

# NAS: Quality, Reliability and Credibility

## Convert Medicolegal System, Workforce Development, Advance Research

- **Recommendation 11:**
  - Improve medicolegal death investigation
    - Support states and jurisdictions to establishing medical examiner systems
      - Replace and eventually eliminate existing coroner systems
      - Build regional medical examiner offices, improve infrastructure & administration, ensure the education, training, increase staffing, modernize their facilities to meet current autopsy safety requirements
    - Support research, education, and training in forensic pathology
      - (NIH should) Create study section to establish goals, to review and evaluate proposals in these areas, and allocate funding for collaborative research to be conducted by medical examiner offices and medical universities
      - Medical student loan forgiveness and/or fellowship support, should be made available to pathology residents who choose forensic pathology as their specialty

# NAS: Quality, Reliability and Credibility

## Improve & Advance Medicolegal Practice

### ■ From Recommendation 11 (Cont.):

- To improve medicolegal death investigation:
  - Establish a Scientific Working Group (SWG) for forensic pathology and medicolegal death investigation
    - promote standards for best practices, administration, staffing, education, training, and continuing education for competent death scene investigation and postmortem examinations
    - promote the utilization of new technologies such as laboratory testing for the molecular basis of diseases and the implementation of specialized imaging techniques.
  - All medical examiner offices should be accredited pursuant to nationally endorsed standards within an acceptable timeframe
  - Federal funding should be restricted to accredited offices that meet endorsed standards or that demonstrate significant and measurable progress in achieving accreditation
  - All medicolegal autopsies should be performed or supervised by a board certified forensic pathologist

# NAS: Quality, Reliability and Credibility

## Maximize Utility, Principal LE Biometric System

### ■ From Recommendation 12:

- Congress should authorize and appropriate funds to launch a new broad-based effort to achieve nationwide fingerprint data interoperability.
- Convene a task force comprising relevant experts from the major scientific and law enforcement agencies (including representatives from the local, state, federal, and, perhaps, international levels) and industry, as appropriate.
- Develop:
  - Common standards to represent and communicate image and minutiae data among AFIS technologies → facilitate sharing of fingerprint data among F, S, L & I law enforcement agencies
  - Baseline standards to map, record, and recognize features in fingerprint images, establish research agenda for continued improvement, refinement, and characterization of accuracy of algorithms

# NAS: Topology of System Improvement



# NAS Report: Provides “What”, Not “How”

- How Do We Best Leverage the NAS Report and Move Forward?
- How Do We Initiate & Establish an Enterprise and Culture of Continuous Improvement?

***Let's Stop "Admiring the Problem" and  
Start "Working the Problem"!***

# The Grand Challenge: Making NAS Report Work for Us

## ■ Where We Are

- Experience, Observation & Opinion “Good, Bad and Ugly”
- Disorganized View of Way Forward
- Status Quo

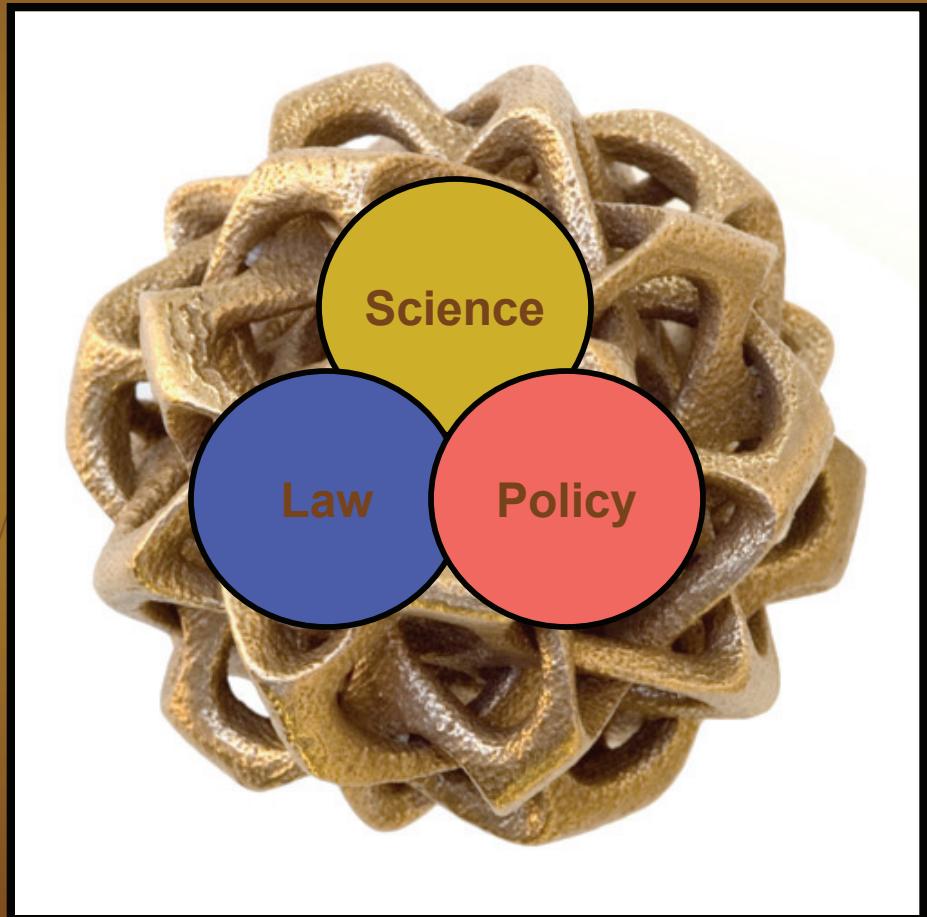
## ■ Where We Should Be

- Coherent, Continuous Improvement @ F, S, L Levels
- Synchronized National Approach
- Acceptable - Desired Future State

**Operative Question: How Do We Get from Here to There?**

# Pursue as Strategic National Effort

- National Priority
- Unity of Purpose
- Undertake as Campaign, Not Event
- Recognize Complexity, Organize and Structure Efforts to Address
- Approach: Integration-Interrelationships of Science & Practice, Law & Policy
- National Strategy
- National Plan, Metrics
- Lean Forward, Build for the Next 10+ Years



# Leadership is Needed

- Many Will Be Watching, Scrutinizing and Learning
- New Style of Leadership Needed: Visionary and Strategic
- Communities Need to Be Harmonized and “Step Up”
- Council of Key Actors (Representing Constituencies), Cuts Across Ecosystem
  - Consistent Message, Unity of Purpose and Action
- Organize for Success: Structures, Processes and Key Positions
- Engage Talent Necessary for Success, Key Nodes and Levels



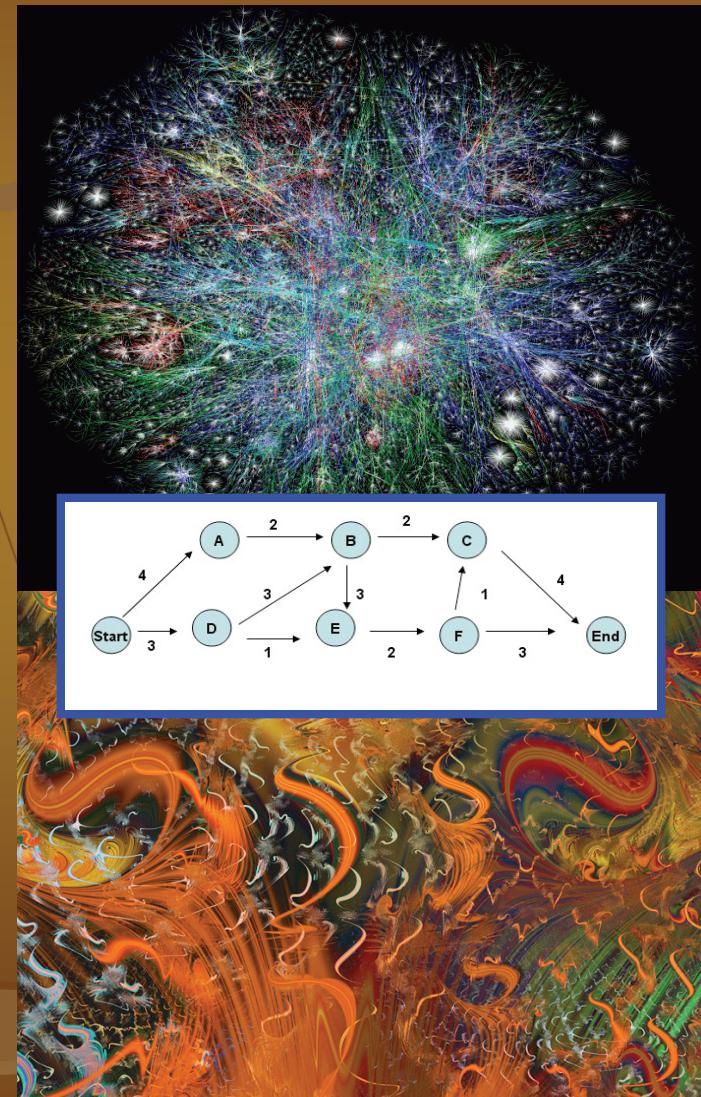
# Requires a National, Multi-Level Campaign, Not an “Event”

- **Effective Campaigns are Built on Effective Strategies and Plans**
  - Accurate, Timely Knowledge, Goals & Objectives
  - Leadership, Leadership, Leadership
  - Structure, Consistency and Continuity
- **“The Long View”**
- **“Command and Control” (Not Management by “Chaos”)**
- **Identify, Prioritize, Fund and Track Smart Investments**
- **Tackle the Most Important Things First and See Them Through**
  - Connect all Actions and Investments to National Requirements
  - Pursuing Everyone’s Pet Project at Once Will Likely Result in Accomplishing Little or Nothing (but We’ll Spend Big Bucks)

**Let's Avoid the Temptation to Simply Throw Money at “The Problem” and Use Shotgun Approach!!**

# Requirements, Strategy & Plan

- **Collect Prior Studies, Assess, Identify Needs, Gaps & Opportunities**
- **Identify and Validate Requirements**
- **Update, Conduct "Systems Analysis"**
- **Formulate Integrated Strategy, Regular Updates**
- **Create Integrated Plan to Achieve Strategy with Milestones, Goals, Objectives, Measures of Effectiveness, Accountability**
- **Emplace Governance System but Work Interactively with Performers, Stakeholders and Overseers**



# Ownership & Accountability

- Need People Who Influence Process and Outcomes to Know What They are Doing and Have the Capacity
- Create Enterprise of Shared Ownership, Shared Value, Shared Benefit, Shared Failure
- Engineer Shift in Enterprise Culture
- Hold Performers Accountable by Those with Credentials and Standing Within Structures
- Clearly Set and Communicate Performance Expectations and Targets

***Need Process Integrity & Transparency***

# Define, Optimize & Leverage Roles, Responsibilities, Expectations

- Federal, State and Local Government Agencies
  - Executive, Legislative (Judicial) Branches
- Forensic Performer Enterprise
- Professional Societies
- Advocacy/Special Interest Groups
- Academia, National Assets
- NGOs
- Media



# Murch's “Top Ten” Priorities

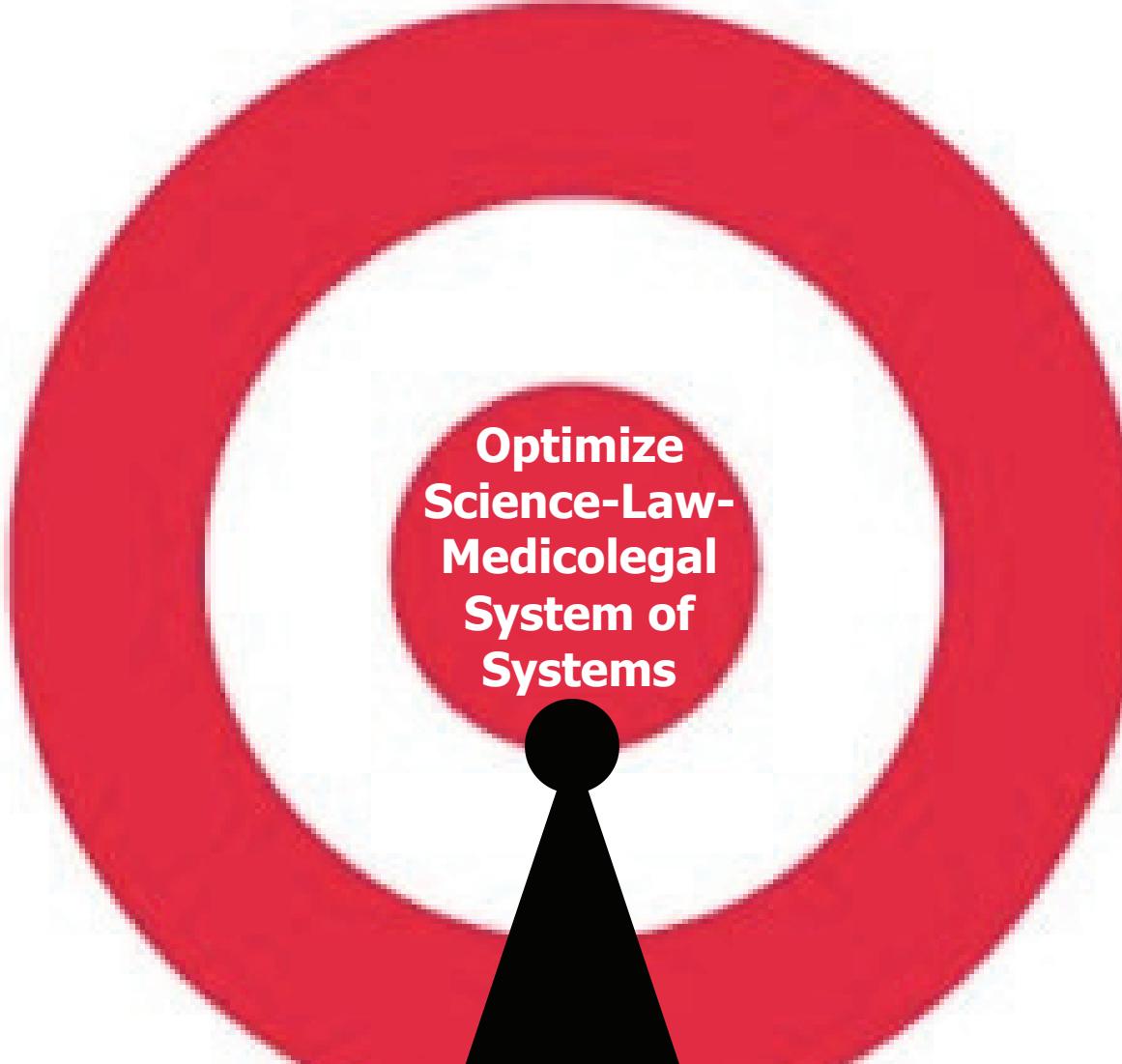
## (Using a Valid, Time-Tested, Strategic Approach)

- Establish & Empower a Governance Process, Emplace, Organize Expert Leadership (National Commission?)
- Validate & Prioritize National Requirements
- Create National 10-Year Strategy & Annual Plans
- Establish Buy-In for Requirements, Strategy & Plans
- Create Budgets & Commitment for Continued Resource Allocation, Incentives
- Align Government and Non-Government Structures & Processes to the Strategy, Plan & Implementation Process
- Harmonize All Forensic Activities Under Strategy, Plan & Oversight (Tailor as Required)
- Perform Additional Studies to Actualize Recommendations
- Establish Legislative & Policy Frameworks
- Start With & Build On Foundations & Fundamentals

***Goal: “Synchronize” Science, Law, Policy Systems***

# Start the Process: Short Term

- ***Begin Alignment “the Enterprise” from the National Perspective***
- ***Collect and Validate National Requirements (Against NAS Recommendations); Conduct Systems Analysis***
- ***Begin to Develop Single National Strategy and Implementable Plan , Subordinate Strategies and Plans (Need Recognized by NAS), with Metrics***
- ***Identify (Agree On) and Resource Highest Impact Projects (Aligned with NAS Recommendations) , Using Existing Programs to Execute for Maximal Interim Gain***



**Optimize  
Science-Law-  
Medicolegal  
System of  
Systems**

***Stay Focused on the Target!!***